Name:                                                                                                          Date:
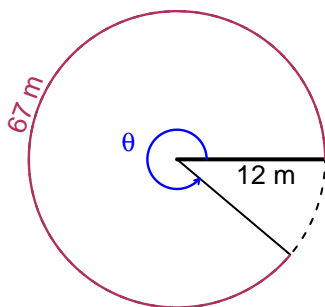
## Trig Final (TEST v613)

- You can use a calculator (like Desmos)
- You should have a unit-circle with special angles and coordinates marked.

### Question 1

In the figure below, we see a circle and a central angle that subtends an arc. The arc length is 67 meters. The radius is 12 meters. What is the angle measure in radians?
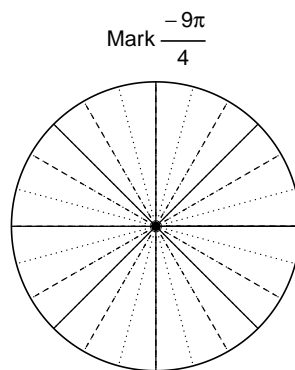


### Question 2

Consider angles $\frac{13\pi}{6}$ and $\frac{-9\pi}{4}$. For each angle, use a spiral with an arrow head to **mark** the angle on a circle below in standard position. Then, find **exact** expressions for $\cos\left(\frac{13\pi}{6}\right)$ and $\sin\left(\frac{-9\pi}{4}\right)$ by using a unit circle (provided separately).

Mark $\dfrac{13\pi}{6}$



Find cos(13π/6)

Mark $\dfrac{-9\pi}{4}$
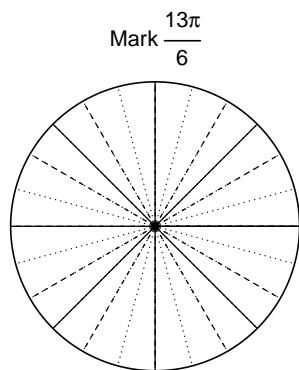


Find sin(−9π/4)

**Question 3**

If $\sin(\theta) = \frac{-56}{65}$, and $\theta$ is in quadrant III, determine an exact value for $\tan(\theta)$.

**Question 4**

A mass-spring system oscillates vertically with an amplitude of 5.39 meters, a midline at $y = 2.27$ meters, and a frequency of 4.15 Hz. At $t = 0$, the mass is at the midline and moving up. Write an equation to model the height ($y$ in meters) as a function of time ($t$ in seconds).